Magnesium Diboride Superconducting Coils for Adiabatic Demagnetization Refrigerators (ADR's), Phase I

Completed Technology Project (2005 - 2005)

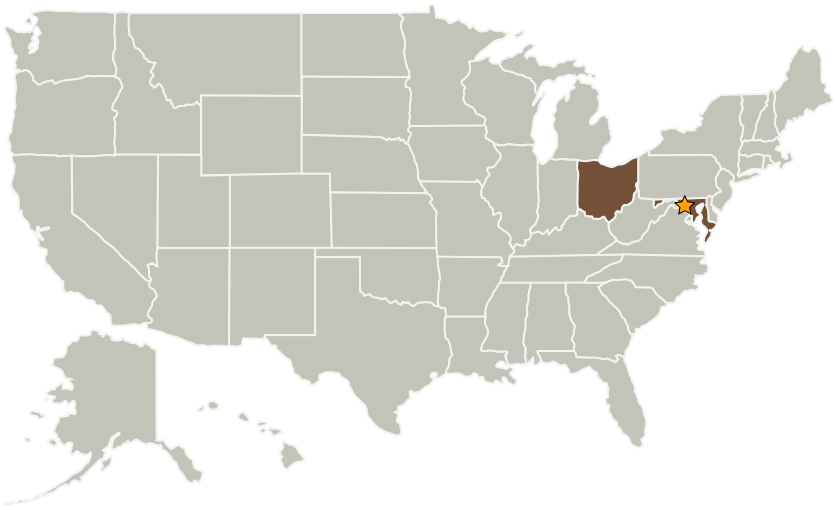
Project Introduction

For Adiabatic Demagnetization Refrigerators(ADR's) for space it is desirable to have very light weight, small diameter, high current density superconducting wires that can operate at temperatures in the 10-30 K range. Magnesium diboride, a light-weight superconductor wire is the ideal candidate coil material for ADRs in the 10-30 K range. During the Phase I we will determine how small of wire can be manufactured, and that coils can be made from the small diameter wires. This will lead to the development of full size ADR coils in a Phase II effort.

Anticipated Benefits

Commercialization of magnesium diboride superconducting wires will allow less expensive and more open MRI systems for medical use, and lower cost and more efficient power utility applications such as transformers, motors, generators, fault current limiters, and SMES. Besides ADR coils, magnesium diboride superconductors can benefit NASA applications for superconducting large aircraft motors, transformers, inductors, magnetic bearings, actuators, MHD magnets, and other potential power conditioning applications.

Primary U.S. Work Locations and Key Partners



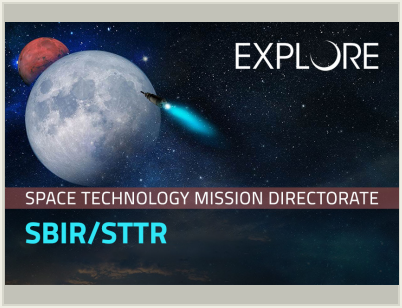


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Table of Contents

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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
Hyper Tech Research, Inc.	Supporting Organization	Industry	Columbus, Ohio

Primary U.S. Work Locations	
Maryland	Ohio

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Project Manager:

John S Panek

Principal Investigator:

Matthew Rindfleisch

Technology Areas

Primary:

- TX14 Thermal Management Systems
  - TX14.1 Cryogenic Systems

Continued on following page.

Magnesium Diboride Superconducting Coils for Adiabatic Demagnetization Refrigerators (ADR's), Phase I

Completed Technology Project (2005 - 2005)

Technology Areas *(cont.)*

- TX14.1.3 Thermal Conditioning for Sensors, Instruments, and High Efficiency Electric Motors